

WHAT IS CLAIMED IS:

- 1. An immunogenic composition comprising:

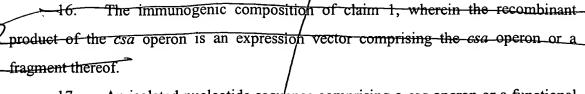
 a recombinant product of a cha operon and a carrier.
- 2. The immunogenic composition of claim 1, wherein the recombinant product of the *csa* operon is CsaA (SEQ ID NO.:2).
- 3. The immunogenic composition of claim 1, wherein the recombinant product of the *csa* operon is at least 95% homologous to CsaA (SEQ ID NO.:2).
- 4. The immunogenic composition of claim 1, wherein the recombinant product of the *csa* operon is CsaB (SEQ ID NO.:4).
- 5. The immunogenic composition of claim 1, wherein the recombinant product of the *csa* operon is at least 55% homologous to CsaB (SEQ ID NO.:4).
- 6. The immunogenic composition of claim 1, wherein the recombinant product of the *csa* operon is CsaC/(SEQ ID NO.:6).
- 7. The immunogenic composition of claim 1, wherein the recombinant product of the *csa* operon is at least 95% homologous to CsaC (SEQ ID NO.:6).
- 8. The immunogenic composition of claim 1, wherein the recombinant product of the csa operon is CsaD (SEQ ID NO.:8).
- 9. The immunogenic composition of claim 1, wherein the recombinant product of the csa operon is at least 95% homologous to CsaD (SEQ ID NO.:8).
- 10. The immunogenic composition of claim 1, wherein the recombinant product of the csa operon is CsaE (SEQ ID NO.:10).
- 11. The immunogenic composition of claim 1, wherein the recombinant product of the *csa* operon is at least 95% homologous to CsaE (SEQ ID NO::10).
- 12. The immunogenic composition of claim 1, wherein the carrier is a composition comprising components suitable for parenteral administration.
- 13. The immunogenic composition of claim 12, wherein the carrier is a composition comprising components suitable for intranasal administration.
- 14. The immunogenic composition of claim 12, wherein the carrier is a composition comprising components suitable for intramuscular administration.
- 15. The immunogenic composition of claim 1, wherein the carrier is a composition comprising components suitable for enteric administration.

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- 17. An isolated nucleotide sequence comprising a *csa* operon or a functional fragment thereof.
- 18. The isolated nucleotide sequence of claim 17, wherein the *csa* operon comprises a *csaA* coding region.
- 19. The isolated nucleotide sequence of claim 18, wherein the *csa* operon comprises the *csaA* coding region of \$EQ ID NO: 1.
- 20. The isolated nucleotide sequence of claim 18, wherein the *csa* operon comprises a nucleotide sequence having at least 95% sequence homology to the *csaA* coding region of SEQ ID NO: 1.
- 21. The isolated nucleotide sequence of claim 17, wherein the *csa* operon comprises *csaB*.
- 22. The isolated nucleotide sequence of claim 21, wherein the *csa* operon comprises the *csaB* coding region of SEQ ID NO; 3.
- 23. The isolated nucleotide sequence of claim 21, wherein the *csa* operon comprises a nucleotide sequence having at least 95% sequence homology to the *csaB* coding region of SEQ/ID NO: 3.
- 24. The isolated nucleotide sequence of claim 17, wherein the csa operon comprises csaC.
- 25. The isolated nucleotide sequence of claim 24, wherein the *csa* operon comprises the *csaC* coding region of SEQ ID NO: 5.
- 26. The isolated nucleotide sequence of claim 24, wherein the *csa* operon comprises a nucleotide sequence having at least 95% sequence homology to the *csaC* coding region of SEQ ID NO: 5.
- 27. The isolated nucleotide sequence of claim 17, wherein the *csa* operon comprises *csaD*.
- 28. The isolated nucleotide sequence of claim 24, wherein the *csa* operon comprises the *csaD* coding region of SEQ ID NO: 7.

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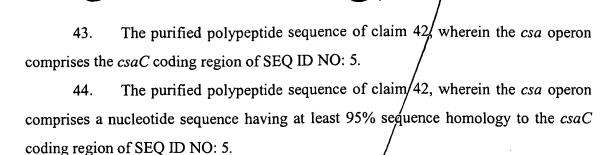


- The isolated nucleotide sequence of claim 24, wherein the csa operon 29. comprises a nucleotide sequence having at least 95% sequence homology to the csaD coding region of SEQ ID NO: 7.
- 30. The isolated nucleotide sequence of claim 17, wherein the csa operon comprises csaE.
 - The isolated nucleotide sequence of claim 30, wherein the csa operon 31. comprises the csaE coding region of SEQ ID NO: 9.
 - The isolated nucleotide sequence of claim 30, wherein the csa operon 32. comprises a nucleotide sequence having at least 95% sequence homology to the csaE coding region of SEQ ID NO: 9.
 - An expression vector comprising a csa operon nucleotide sequence or an 33. antigenic fragment thereof.
 - A host cell comprising the expression vector of claim 33. 34.
 - 35. A purified polypeptide sequence expressed from a recombinant csa operon or an antigenic fragment thereof
 - The purified polypertide sequence of claim 35, wherein the csa operon 36. comprises a csaA coding region
 - The purified polypeptide sequence of claim 35, wherein the csa operon 37. comprises the csaA coding region of SEQ ID NO: 1.
 - 38. The purified polypeptide sequence of claim 37, wherein the csa operon comprises a nucleotide sequence/having at least 95% sequence homology to the csaA coding region of SEQ ID NO: 1.
 - 39. The purified polypeptide sequence of claim 35, wherein the csa operon comprises csaB.
 - The purified polypeptide sequence of claim 39, wherein the csa operon 40. comprises the csaB coding region of SEQ ID NO: 3.
 - The purified polypeptide sequence of claim 39, wherein the csa operon 41. comprises a nucleotide sequence having at least 95% sequence homology to the csaB coding region of SEQ ID NO: 3.
 - 42. The purified polypeptide sequence of claim 35, wherein the csa operon comprises csaC.

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- 45. The purified polypeptide sequence of claim 35, wherein the csa operon comprises csaD.
- 46. The purified polypeptide sequence of claim 45, wherein the *csa* operon comprises the *csaD* coding region of SEQ ID NO. 7.
- 47. The purified polypeptide sequence of claim 45, wherein the *csa* operon comprises a nucleotide sequence having at least 95% sequence homology to the *csaD* coding region of SEQ ID NO: 7.
- 48. The purified polypeptide sequence of claim 35, wherein the *csa* operon comprises *csaE*.
- 49. The purified polypeptide sequence of claim 48, wherein the *csa* operon comprises the *csaE* coding region of SEQ ID NO: 9.
- 50. The purified polypeptide sequence of claim 48, wherein the *csa* operon comprises a nucleotide sequence baving at least 95% sequence homology to the *csaE* coding region of SEQ ID NO. 9
 - 51. A method of generating an immune response, comprising:

 providing an immunogenic composition to a subject, wherein said immunogenic composition comprises a recombinant product of a *csa* operon; and

contacting said subject with said immunogenic composition, whereby an immune response/is generated in said subject.

- 52. The method of claim 51, wherein the product of the *csa* operon is the CS4 antigen.
- 53. The method of claim 52, wherein the CS4 antigen is provided in an acellular composition.
- 54. The method of claim 52, wherein the CS4 antigen is provided in a cellular composition.

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- 55. The method of claim 51, wherein the recombinant product of the csa operon is CsaA (SEQ ID NO.:2).
- 56. The method of claim 51, wherein the recombinant product of the csa operon is at least 95% homologous to CsaA (SEQ ID NO.:2).
- 57. The method of claim 51, wherein the recombinant product of the csa operon is CsaB (SEQ ID NO.:4).
- 58. The method of claim 51, wherein the recombinant product of the csa operon is at least 95% homologous to CsaB (SEQ ID NO.:4).
- 59. The method of claim 51, wherein the recombinant product of the csa operon is CsaC (SEQ ID NO.:6).
- 60. The method of claim 51, wherein the recombinant product of the csa operon is at least 95% homologous to CsaC (SEQ ID NO.:6).
- 61. The method of claim 51, wherein the recombinant product of the csa operon is CsaD (SEQ ID NO.:8).
- 62. The method claim 51, wherein the recombinant product of the *csa* operon is at least 95% homologous to CsaD (SEQ ID NO.:8).
- 63. The method of claim 51, wherein the recombinant product of the csa operon is CsaE (SEQ ID NO.:10).
- 64. The method of claim 51, wherein the recombinant product of the csa operon is at least 95% homologous to CsaE (SEQ ID NO.:10).
- 65. The method of claim 51, wherein the carrier is a composition comprising components suitable for parenteral administration.
- 66. The method of claim 65, wherein the carrier is a composition comprising components suitable for intranasal administration.
- 67. The method of claim 65, wherein the carrier is a composition comprising components suitable for intramuscular administration.
- 68. The method of claim 51, wherein the carrier is a composition comprising components suitable for enteric administration.
- 69. A method of producing a polypeptide product from a csa operon or functional fragment thereof, comprising:

providing the csa operon in an expression vector;

introducing the expression vector into a host cell, such that a recombinant host cell is produced; and

subjecting to the recombinant host cell to conditions such that a protein from the *csa* operon is expressed.

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- 70. The method of claim 69, wherein the polypeptide product of the csa operon is the CS4 antigen.
- 71. The method of claim 69, wherein the polypeptide product of the csa operon is CsaA (SEQ ID NO.:2).
- 72. The method of claim 69, wherein the polypeptide product of the *csa* operon is at least 95% homologous to CsaA (SEQ ID NO.:2).
- 73. The method of claim 69, wherein the polypeptide product of the csa operon is CsaB (SEQ ID NO.:4).
- 74. The method of claim 69, wherein the polypeptide product of the csa operon is at least 95% homologous to CsaB (SEQ ID NO.:4).
- 75. The method of claim 69, wherein the polypeptide product of the csa operon is CsaC (SEQ ID NO.:6).
- 76. The method of claim 69, wherein the polypeptide product of the csa operon is at least 95% homologous to CsaC (SEQ ID NO.:6).
- 77. The method of claim 69, wherein the polypeptide product of the csa operon is CsaD (SEQ ID NO.:8).
- 78. The method claim 69, wherein the polypeptide product of the *csa* operon is at least 95% homologous to *CsaD* (SEQ ID NO.:8).
- 79. The method of claim 69, wherein the polypeptide product of the csa operon is CsaE (SEQ/ID NO.:10).
- 80. The method of claim 69, wherein the polypeptide product of the *csa* operon is at least 95% homologous to CsaE (SEQ ID NO.:10).
- 81. A method for generating an immune response in a vertebrate against ETEC, comprising administering to the vertebrate an amount of a polynucleotide operatively encoding at least an immunogenic portion of the *csa* operon and having at least about 15 nucleotides, or administering a polypeptide encoded thereby.